



TOWN OF LONGBOAT KEY

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March 13, 2013

Subject property: The Colony, 1620 Gulf of Mexico Drive

Regarding: Buildings located seaward of the Coastal Construction Control Line (CCCL). To determine by Building Code and its referenced standards if the concrete vertical support member between the footing and the structural floor beam is a component of the foundation or the structure above and the impact as it relates to the 2010 Florida Building Code (FBC) section 3109.

Building Data:

Two story, wood framed, multi-family buildings.

Elevated Floor system with open crawlspace under. Footings with piers/columns connecting to a beam system of the structure. Not a code prescriptive design.

On site exploratory findings from an excavation at building 1: Sign of continuous strip footings. Top of footing 16 to 20 inches below the surface grade. Piers or columns appear to be poured contiguous to the footing. Piers/columns extend out of the ground 22 to 28 inches above grade. Piers/columns are 10-inches square with #5 vertical reinforcements in each corner some with #3 stirrups. Piers/columns show extensive vertical cracks, spalling, and exposed reinforcement. Exposed reinforcement shows corrosion. Some locations the reinforcement has sprung from the concrete. Year of Construction: 1973 Non-conforming, Pre-Firm. January 1, 1975 was the first adoption of a firm to be used by this Jurisdiction.

Current flood designation of buildings seaward of the coastal construction control line: A13 (EL 12) and A13(EL11), Firm panels: 5, 10, Community – panel Number 1251260001-0010 revised May 18, 1992. At the time of construction there was no established design flood elevation (DFE).

Code reference associated to repairs in existing buildings is the 2010 Florida Building Code Existing Building (FBC-EC) section 501.3.1. This section is associated to repairs in chapter 5 of the Existing Building Code. It is directing one to also go to the 2010 Florida Building Code (FBC) section 3109 for buildings seaward of the coastal construction control line.

FBC Section 3109.1 **Scope** provides requirements associated to structures located seaward of the coastal construction control line (CCCL). To this section and subsections there is an exception to the requirements.

Exception: The standards for buildings seaward of a CCCL area do not apply to any modification, maintenance, or repair of an existing structure within the limits of the existing foundation which does not require, involve or include any additions to, or repair or modification of, the existing foundation of that structure.

The same language is found in Florida State Statutes 161.052(6) and 161.053(11)(a). However, section 161.053(11)(a) has the follow sentence at the end. "The Florida Building Commission may not adopt any rule having the effect of limiting any exceptions or exemptions contained within this paragraph."

My Building Official interpretation of the intent of FBC 3109.1 exception. Structural and/or non-structural work maybe performed to a structure up to the substantial improvement limitations of any existing building that is within the periphery of the existing foundation. Any such work performed shall not involve any work to the foundation. Substantial improvement is addressed in other sections of the building code.

The purpose of this requirement was to establish a guideline for requiring existing non-compliant /pre-firm buildings to become elevated compliant structures based on its location seaward of the CCCL when work to the existing foundation is required.

The word standards is not in reference to code section 3109.1, but for the referenced standards as referenced in FBC section 1612.4.

The use of the terms "PIER" and "PIER FOUNDATION".

A pier as it relates to construction is a vertical structural element that supports a floor system. A pier has many synonyms; column, pedestal, pilaster, pillar, post, and stanchion are ones that have been found. All of which are used as construction terms. All of which have a description of being a vertical structural support member.

A pier may also be referred to as a caisson or drilled pier. This type of pier is generally considered as a deep foundation design. There are also shallow foundation piers that are hand dug. At this subject property neither of these are the design of the foundation system.

ACI 318 *Building Requirements For Structural Concrete* has definitions for Column and Pedestal. Neither definition nor any section associated to the terms and the principle use provide any indication that it is, or is not a part of the foundation system. ACI 318 by its self does not provide for design of a foundation systems. It provides for the design requirements of the elements that may be used in a foundation system as well as elements to a structure.

Section 2102.1 of the FBC does have a term "Foundation Pier" An isolated vertical foundation member whose horizontal dimension measured at right angles to its thickness does not exceed three times its thickness and whose height is equal to or less than four times its thickness. The site condition the piers are of concrete. Being of concrete would not be determination that it is no longer a Foundation Pier. The function would be the same.

Regardless of what the actual term is used it is still the vertical element that is partially below grade and completes above grade. The use of providing another term does not necessarily lend it as not being a component of the foundation system.

The use of the term "PIER FOUNDATION" can be referenced through building codes. In the 2009 International Building Code (IBC) there is a code section 1805.5.7 that is titled **Pier and Curtain wall foundation**. This is considered as a prescriptive method. The IBC is the base code for the Florida Building Code with changes as necessary to meet Florida specific requirements. This is also found as section 1809.10 of the FBC as *Reserved*. This type of foundation is considered as a shallow foundation system as it is within section 1805 of the IBC and section 1809 of the FBC titled **Shallow Foundations**. The reserving of this particular section appears to reflect that this foundation system is not adequate or an unacceptable method for use in the State of Florida. This type of system however was in the earlier editions

of the Florida Building Code. Limitations on its use were outlined. Other similar terms that are used in the industry are Pier and Beam Foundation, and Pier and Footing Foundation. Reference documents as well as online searching associated to these terms show a similar design to the buildings on this subject site. Many of which show the pier/column as a component of the foundation system.

Although there are differences in design both foundation systems described above use piers/columns to elevate the structure above grade and provide for what can be classified as a crawlspace under the structure. To meet flood requirements there should be no obstructions such as the curtain wall. This would lend the design to be an open crawlspace. The FBC definition of a crawlspace is a shallow unfinished space beneath the first floor or under the roof of a building especially for access to plumbing or wiring. A crawlspace is generally assumed to have surrounding walls. A crawlspace could also be considered as open. There is no code reference to that defines a crawlspace as requiring perimeter walls.

FBC section 1612.5 item 2.2. Construction documents shall include a statement that the building is designed in accordance with ASCE 24, including that the pile or column foundation and building or structure to be attached thereto is designed to resist flotation, collapse and lateral movement due to the effects of wind and flood loads acting simultaneously on all building components, and other load requirements of chapter 16. This would reflect that the column is a part of the foundation system.

Though a web search I found many articles and publications available from the industry that reference pier foundations or systems that resemble the design of the subject site. American Society of Civil Engineers (ASCE) has even hosted seminars in Florida on this subject. Most recent was in July of 2012. In HUD 4930.36 in chapter 5 **Foundations** there is a code reference of use of piers for support of a manufactured home. The Southern Pine Council hosts seminars on pier and beam construction. There are many documents from Federal Emergency Management Agency (FEMA) that reference the use of pier foundation systems to elevate the structure. FEMA 259 as a single example. All indicate the pier/column as being a component of the foundation system.

Based on research the Pier and Footing design at this subject site is not a desired foundation system, especially at this properties flood zone determination of A13. The data available and publications associated to this foundation system indicating that it is highly susceptible to failure when there are hydrodynamic and hydrologic water forces involved.

In ASCE/SEI 24-05 a referenced document from the Florida Building Code there are foundation requirements in section 1.5.3. In section 1.5.3.4 **Piers, Posts, Columns, or Piles;** Piers, post Columns or Piles used to elevate a structure above DFE in flood hazard areas shall comply with all applicable foundation requirements of this standard. In Coastal High Hazard areas and Coastal A Zones, piers, posts, columns, or piles used to elevate a structure shall be designed and constructed in accordance with section 4. Connections between footings, mat, or raft foundations and piers, posts, and columns shall meet all applicable requirements of this standard. Going to Section 4.5 **Foundation Requirements** there is section 4.5.7. **Posts, Piers, and Columns** are addressed. This would reflect the direct relationship as being part of the foundation system.

ASCE/SEI 7-10 *Minimum Design Loads for Buildings and other structures* section C5.3.3 **Loads on breakaway walls** First sentence Floodplain management regulations require buildings in coastal high hazard areas to be elevated to or above design flood elevation by a pile or Column foundation. This would reflect that a column for support of the structure is part of a foundation system.

FBC section 1802 has a definition for **Shallow Foundation:** is an individual or strip footing, a mat foundation, a slab-on-grade foundation or a similar element. A similar element could be a

foundation wall, a grade beam, wood foundation, or in the case of this subject site it could be concrete or masonry columns on a footing. The intent of the building code is not to create a restriction foundation designs that may be used. In this case it was just providing a partial list of what can qualify as a shallow foundation.

The Florida Building Code has a reference for foundation elevation section 1808.7.4. Based on this one would assume that the top of the foundation would be at a minimum 12-inches plus 2% above a street gutter or discharge inlet of an approved drainage system. There is allowance for an alternate design based on the demonstration of adequate drainage away from the structure. Based on code intent a foundation system continues above grade. This subject property has footings where the top is subterranean and have approximately 16-inches of earth cover, and the columns continuing up to a building floor beam. Section 1809.4 relates to the minimum depth required for the footing. The minimum depth of footings below the undisturbed ground surface shall be 12-inches. Per handbooks and commentaries this is associated to the bottom of the footing.

Based on ASCE/SEI 24-05 alone that references piers as being a part of the foundation system to provide the support of the structure, supported by all other available documentation. Based on your letter and accompanying documentation I do not see where it categorically determines that the concrete pier/column is not a component of the foundation system. It does demonstrate that there many ways to use the terms and definitions to derive different conclusions. Based on the building code and referenced standards it appears to be an element of the foundation system.

In conclusion based on the information provided above the piers/columns for this subject property have a direct relationship to being a component of the foundation system.

If you disagree with this conclusion you may appeal this to the Florida Building Commission in accordance with the procedures outlined in Florida State Statute 553.775(3)(c) for a formal interpretation.

Sincerely,

Wayne R. Thorne
Building Official
Longboat Key, Florida